

## Effect of Implementing Discharge Plan on Health Outcomes of the Adult Congestive Heart Failure Patients

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### ABSTRACT

**Background:** Congestive heart failure (CHF) prompt discharge nursing planning is aimed to expand knowledge concerning CHF, promote self-care practices, improve clinical outcomes and minimize readmission.

**Objective:** Determination of the effect of implementing discharge plan on health outcomes of the adult CHF patients.

**Materials and Methods:** The study was conducted at the Inpatient Cardiology Department, Alexandria Main University Hospital and its affiliated Outpatient Cardiac Clinic. A convenience sample of seventy hospitalized CHF patients, who were sequentially divided into 2 equal groups; control group: exposed to routine hospital care and study group: received the discharge plan. Four tools were used; Tool I: Congestive Heart Failure Patients' Nursing Assessment, Tool II: Atlanta Heart Failure Knowledge Test, Tool III: Congestive Heart Failure Health Outcome Indicators and Tool IV: Self-Care of Heart Failure Index.

**Results:** There was significant difference between the two studied groups in relation to overall CHF knowledge mean scores after implementing the discharge plan. A statistical significant difference was noticed between the studied group's patients in relation to overall mean scores of self-care maintenance scale, self-care management scale, and self-care confidence scale.

**Conclusion:** Implementing the developed discharge plan has significantly improved the overall knowledge, self-care practice confidence of adult CHF patients.

**Keywords:** Self-Care practice, Health outcomes, Knowledge, Discharge plan, Heart failure, Cardiology nursing.

### INTRODUCTION

Heart failure (HF) is one of the epidemics of modern cardiovascular medicine affecting negatively on patients, their families and global financial resources <sup>(1)</sup>. The number of individuals diagnosed with CHF is increasing and expected to rise to 46% by 2030. However, 1-2% of the worldwide adult population suffers from HF <sup>(2)</sup>. It is well known that; CHF is a clinical syndrome leading to the inability of the heart to pump necessary blood volume for meeting the various metabolic demands due to the presence of symptoms of pulmonary or peripheral congestion. Clinical presentations could be acute on top of compensated HF. Its pharmacological treatment is lifelong mandating the patients to follow dietary regimen, monitor body weight, detect fluid retention, and manage changes in energy <sup>(3)</sup>.

Discharge planning is the development of an individualized plan that primarily focuses on improving the quality of discharge patients' compliance, education/counseling, and structured follow-up <sup>(4)</sup>. The clinical cardiology nurse is an integral multidisciplinary team member caring for hospitalized CHF patients applying the nursing process, considering each patient's physical, psychological or spiritual needs <sup>(5)</sup>.

Accordingly; the discharge nursing plan is a continuous process starts early during hospitalization and continues post-discharge; aiming to reduce

hospital readmissions, and contributing to clinical stability through improving patients' knowledge and promoting self-care capabilities in order to enhance their self-care maintenance, management, and confidence in managing their condition, which in turn enrich their quality of life (QOL) <sup>(6)</sup>.

Self-care concept includes both the decisions and procedures that should be followed to maintain both healthy life functioning and well-being. Improvement of CHF patients' self-care behavior aimed to clinically practice the non-pharmacological nurse-led management programs <sup>(7)</sup>. These continuous educational nursing interventions are required to improve HF knowledge, encourage self-care behaviors concerning daily weight monitoring, exercises performance, regular use of medication, as well as monitoring manifestations <sup>(8)</sup>.

The aim of the present work was to; determine the effect of implementing the discharge plan on health outcomes of the adult patients with CHF. It hypothesized an improvement of CHF study group patients' health outcomes in relation to knowledge and self-care scales after the implementation of an individualized nursing discharge plan.

### MATERIALS AND METHOD

**Design:** A quasi-experimental research design was utilized to fulfill the study aim.



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**Subjects:** Included 70 CHF patients who were admitted in the inpatient ward and attended for follow-up in Outpatient Clinic of the Department of Cardiology in Alexandria Main University Hospital. They were randomly recruited into two sequential equal groups (35 patients each): Group I: **study group** received individualized discharge care plan, while Group II: **control group** received the routine hospital care only.

**Inclusion criteria:** Adults diagnosed with CHF for longer than 3 months, are hospitalized on cardiac treatment, able to communicate verbally and did not receive previous CHF discharge plan.

**Four tools were utilized:**

**Tool one: Congestive Heart Failure Patients' Nursing Assessment Sheet:** It was developed after reviewing recent relevant literature <sup>(9-11)</sup> and was translated into Arabic by researchers; it consisted of four parts:

**Part I:** Patient's socio-demographic characteristics, **Part II:** Patients' health history, **Part III:** Routine laboratory and diagnostic tests, and **Part IV:** Patient's health problems/needs.

**Tool two: Atlanta Heart Failure Knowledge Test (AHFKT-V2):** It was developed and revised by **Reilly et al.** <sup>(12)</sup> and **Butts et al.** <sup>(13)</sup>; its reliability = 0.84 and translated into Arabic by researchers. This tool focuses on **five CHF knowledge domains; CHF disease process/pathophysiology** (2 items), **nutrition** (11 items), **behavior** (6 items), **medications** (6 items), and **symptom assessment/management** (5 items) with a total of 30 multiple choice questions (MCQ) in order to assess patients' knowledge, health literacy and enable adherence to CHF self-care demands. Each correct answer was converted into 0 to 100 percentages; higher scores indicating adequate knowledge about CHF self-care demands. The knowledge score levels were categorized as good ≤ 75% - 100%, Fair from 50%-74% and Poor > 50%.

**Tool three: Congestive Heart Failure Health Outcome Indicators:** It was developed after reviewing related literature <sup>(14-16)</sup> to assess the health outcome indicators after implementing the discharge plan. It consisted of three parts: **Part I:** Respiratory status indicators included (0-26) items scored as: (0) = Not present, (1) = Deteriorated and (2) = Improved. **Part II:** Cardiac status indicators comprised (0-20) items scored as: (0) = Not present, (1) = Deteriorated and (2) = Improved. **Part III:** Functional status indicators contained (0-56) items scored as: (0) = Dependent, (1) = Partial dependent and (2) = Independent. Each part scores were summed to get total health outcome score; higher scores indicates **better** health outcome indicators.

**Tool four: Self-Care of Heart Failure Index (SCHFI V6.2 English):** It was developed and

updated by **Riegel et al.** <sup>(17)</sup> and **Siabani et al.** <sup>(18)</sup>. It composed of 22 questions distributed on three scales: (10) for self-care maintenance, (6) for self-care management, and (6) for self-care confidence. The three subscales were scored from (0 – 100) each.

**Ethical approval:**

**An official letter was issued to the Cardiology Department Head after Faculty of Nursing Ethical Committee approval for the study to collect the study data.** Privacy was assured. Anonymity and confidentiality were maintained. Patient's right to withdraw at any time was respected.

- An Arabic educational program was developed by the researchers' after reviewing the relevant literature and containing health information regarding CHF <sup>(7, 10, 12, and 19)</sup>.
- The study tools and the educational program were submitted to 5 experts in Medical-Surgical Nursing field to test their content validity, and necessary modifications were done accordingly.
- Reliability of tools I, II, III and IV was estimated using Cronbach's Alpha test; and were (0.719, 0.84, 0.782 and 0.735 respectively).
- Pilot study was conducted on 7 patients, who were excluded from the study sample, to test tools and the educational program clarity, feasibility, and applicability, and then necessary modification was done.
- **The discharge plan was carried-out in four phases:**

**Phase I: Assessment:**

- An individualized interviews were done after patients' admission at Cardiology Department; researchers started by introducing themselves, explaining study aim and obtaining patient's consent.
- Initial both groups assessment was carried out using tool I and II to collect baseline needs, health condition knowledge and its related self-care practices.
- Subjective and objective data were collected through physical examination, to elicit actual and potential clinical problems. Data from control group were collected first.

**Phase II: Planning:**

- An individualized discharge care plan was developed for each study group patients based on the assessment phase.
- Steps of patients' discharge plan included:
  - Prioritizing problems and needs.
  - Formulating nursing diagnosis based on NANDA-I 2018-2020 11<sup>th</sup> editions.
  - Setting goals.
  - Arranging nursing interventions.

- Preparing educational booklet learning aid.

### Phase III: Implementation (4 sessions):

- The first session started with initial study group individualized reassessment at the Cardiology Department.
- Second session included application of specific nursing interventions, while using the booklet for providing the mentioned health education items.
- In third session, remaining individualized nursing interventions was implemented, using the developed booklet. While in the fourth session, each hospitalized patient understanding was monitored through a researchers-patient interview for further explanations.
- Each session consumed nearly one hour. Every patient repeated the given instruction at two separate individual sessions. The researchers ensured and enforced patients' use of the distributed educational booklet by the researchers as a reference at home.

### Phase IV: Evaluation (3 evaluations):

- First evaluation of both groups was done using tool III 24 hours before discharge.
- Second evaluation was performed one month after discharge, while third evaluation was three

months thereafter using tools II and IV at the cardiology outpatient clinic or by phone calls.

- The two groups' tools' scores were compared to determine the discharge plan implementation effect on CHF patients' health outcomes.
- Data were collected from October 2018 to November 2019.

### Statistical analysis

Data were analyzed using IBM SPSS software version 20.0. Qualitative data were described using numbers and percent. Quantitative data were described using range, mean, and standard deviation. The selected level of significance was P at 5%.

### RESULTS

**Table (1)** showed socio-demographic data; as more than half of both patients' groups were females (60.0%, 54.3% respectively). Both groups' age highest percentages were between 50-60 years (51.4%, 68.6% respectively). As regards the educational level, equal percentages of illiterate patients were found in both groups representing 22.8%. No socio-demographics significant difference was declared.

**Table (1):** Sociodemographic characteristics frequency distribution of the studied groups

Patient's socio-demographic characteristics	Control (n = 35)		Study (n = 35)		$\chi^2$	P
	No.	%	No.	%		
<b>Gender</b>						
Female	21	60.0	19	54.3	0.233	0.629
Male	14	40.0	16	45.7		
<b>Age</b>						
40 ≤ 49	17	48.6	11	31.4	2.143	0.143
50 ≤ 60	18	51.4	24	68.6		
<b>Level of Education</b>						
Illiterate	8	22.8	8	22.8	7.029	<sup>MC</sup> p=0.072
Literate	27	77.2	27	77.2		
<b>Marital Status</b>						
Married	29	82.8	25	71.5	2.073	<sup>MC</sup> p=0.401
Widow	5	14.3	6	17.1		
Divorced	1	2.9	4	11.4		

$\chi^2$ : Chi square test      MC: Monte Carlo      p: p comparing value between the studied groups

\*: Statistically significant at p ≤ 0.05

**Table (2)** displayed health history frequency distribution between both groups. All patients were complaining of dyspnea, reduced exercise tolerance, and fatigue. Control and study group patients (80.0%, 71.4% respectively) had IHD. A statistically significant difference between both groups regarding anemia (p = 0.031\*) was declared. Approximately three quarters (74.3%) of the control group and around half (51.4%) of the study group suffered from ischemic cardiomyopathy, with statistically significant difference (p = 0.048\*). Respectively, 37.1% of control and study groups were diagnosed from 4 ≤ 5 years and from 3 ≤ 4 years.

**Table (2):** Frequency distribution of control and study groups' patients according to health history and life style

Patients' health history	Control (n = 35)		Study (n = 35)		$\chi^2$	P
	No.	%	No.	%		
<b>Reasons of hospital admission:</b>						
Dyspnea	35	100.0	35	100.0	–	–
Orthopnea	23	65.7	25	71.4	0.265	0.265
Paroxysmal nocturnal dyspnea	23	65.7	24	70.6	0.189	0.664
Reduced exercise tolerance	35	100.0	35	100.0	–	–
Fatigue	35	100.0	35	100.0	–	–
Nocturnal cough	14	40.0	19	54.3	1.433	0.231
Lower limb edema	34	97.1	33	94.3	0.348	<sup>FE</sup> p=1.000
Ascites	11	31.4	15	42.9	0.979	0.322
<b>Associated diseases:</b>						
Hyperlipidemia	12	34.3	20	57.1	3.684	0.055
Hypertension	24	68.6	22	62.9	0.254	0.615
Diabetes mellitus	21	60.0	23	65.7	0.245	0.621
Anemia	14	40.0	23	65.7	4.644*	0.031*
Ischemic heart disease	28	80.0	25	71.4	0.699	0.403
<b>Etiology of heart failure</b>						
Hypertrophic cardiomyopathy	19	54.3	17	48.6	0.229	0.632
Ischemic cardiomyopathy	26	74.3	18	51.4	3.916*	0.048*
Valvular heart disease	25	71.4	22	62.8	1.701	0.192
Anemia	6	17.1	3	8.6	1.148	<sup>FE</sup> p=0.477
<b>Years of being diagnosed with heart failure</b>						
1 ≤ 4 yrs	18	51.4	20	57.1	0.740	<sup>MC</sup> p=0.893
4 More than 5 yrs	17	48.6	15	42.9		
<b>Patients' life style</b>						
<b>Smoking</b>						
No	20	57.1	18	51.4	0.230	0.631
Yes	15	42.9	17	48.6		
<b>Dietary intake:</b>						
<b>Likes</b>						
Not consistent with recommended diet	35	100.0	35	100.0	-	-
<b>Dislikes</b>						
Not consistent with recommended diet	28	80.0	31	88.6	-	-

FE: Fisher Exact

**Table (3)** illustrated patients' clinical data, where chemistry tests, CBC, and echocardiography examination were requested for all patients. Concerning CHF nursing diagnosis; excess fluid volume, activity intolerance and knowledge deficit were observed in 100% of all patients.

**Table (3):** Frequency distribution of control and study groups' patients according to clinical data

Patients' clinical data	Control (n = 35)		Study (n = 35)		$\chi^2$	p
	No.	%	No.	%		
<b>Biochemical Tests:</b>						
CBC	35	100.0	35	100.0	–	–
Chemistry tests	35	100.0	35	100.0	–	–
Coagulation tests	19	54.3	17	48.6	0.229	0.632
<b>Diagnostic Tests:</b>						
Chest X-ray	29	82.9	27	77.1	0.357	0.550
Ultrasound abdomen	10	28.6	12	34.3	0.265	0.607
Echocardiography	35	100.0	35	100.0	–	–
<b>Nursing diagnosis:</b>						
Reduced cardiac output	35	100.0	35	100.0	–	–
Excess fluid volume	35	100.0	35	100.0	–	–
Activity intolerance	35	100.0	35	100.0	–	–
Knowledge deficit	35	100.0	35	100.0	–	–
Risk for impaired gas exchange	20	57.1	20	57.1	0.000	1.000
Anxiety	18	51.4	24	68.6	2.143	0.143

**Table (4)** displayed the overall knowledge mean percent scores after one and three months, where they were improved significantly in the study group representing  $94.48\% \pm 15.55\%$  and  $93.05\% \pm 17.55\%$  respectively compared to constant mean percent scores ( $18.95\% \pm 6.90\%$ ) in control group. There was statistically significant difference ( $P < 0.001^*$ ) in relation to overall CHF knowledge mean scores.

**Table (4):** Overall knowledge mean scores of control and study CHF patients during hospitalization, after one month and 3 months post implementing the discharge plan

Congestive heart failure patient's overall knowledge mean scores.	Control group (n=35)						Study group (n=35)						Test of sig. (p-value)		
	Baseline data		1 month Follow up		3 months Follow up		baseline data		1 month Follow up		3 months Follow up				
	N	%	N	%	N	%	N	%	N	%	N	%	p <sub>1</sub>	p <sub>2</sub>	p <sub>3</sub>
Poor (<50%)	34	97.1	34	97.1	34	97.1	35	100.0	0	0.0	0	0.0	$\chi^2=1.014$ ( <sup>FE</sup> p=1.000)	$\chi^2=82.947^*$ ( <sup>MC</sup> p<0.001*)	$\chi^2=82.582^*$ ( <sup>MC</sup> p<0.001*)
Fair (50 - <75%)	1	2.9	1	2.9	1	2.9	0	0.0	6	17.1	7	20.0			
Good (≥75%)	0	0.0	0	0.0	0	0.0	0	0.0	29	82.9	28	80.0			
Mean score:													t=0.141 (0.889)	t=26.27* <0.001*	t=23.24* <0.001*
Min–Max	3.0 – 15.0		3.0 – 15.0		3.0 – 15.0		4.0 – 9.0		17.0 – 31.0		16.0 – 31.0				
Mean ± SD	5.63 ± 2.06		5.69 ± 2.07		5.69 ± 2.07		5.57 ± 1.24		28.34 ± 4.66		27.91 ± 5.27				
Mean % score:													t=0.141 (0.889)	t=26.27* <0.001*	t=23.24* <0.001*
Min–Max	10.0 – 50.0		10.0 – 50.0		10.0 – 50.0		13.33 – 30.0		56.67– 103.3		53.33 – 103.3				
Mean% ± SD%	18.76 ± 6.86		18.95 ± 6.90		18.95 ± 6.90		18.57 ± 4.14		94.48 ± 15.55		93.05 ± 17.55				
<b><sup>F</sup>P<sub>0</sub></b>			–		–				<0.001*		<0.001*				

**t: Student t-test F:F-test** p: p value for comparing between the studied periods in each group p<sub>1</sub>: p value for comparing between the studied groups in **Baseline**, p<sub>2</sub>: p value for comparing between the studied groups in **1 month follow up (F/U)**, p<sub>3</sub>: p value for comparing between the studied groups in **3 month follow up (F/U)**, \*: Statistically significant at  $p \leq 0.05$  Furthermore, **overall congestive heart failure patients' health status indicators** 24 hours before hospital discharge, mean scores were  $92.83 \pm 3.14$ , and  $91.43 \pm 4.56$  respectively among control and study groups patients' with no statistically significant difference between the two studied groups ( $p= 0.139$ ) as shown in table (5).

**Table (5):** Comparison between studied groups related to their health outcome indicators 24 hours before hospital discharge

Health outcome indicators.	Control group (N= 35)						Study group (N= 35)						$\chi^2$	p
	Independent		Partial dependent		Dependent		Independent		Partial Dependent		Dependent			
	N	%	N	%	N	%	N	%	N	%	N	%		
Part I: Overall respiratory status indicators mean scores:	21.51 ± 1.77						20.66 ± 2.63						t=1.597	0.115
Part II: Overall cardiac status indicators mean scores:	18.23 ± 0.94						18.17 ± 0.57						t=0.307	0.760
Part III: Overall functional status indicators mean scores:	53.09 ± 2.94						52.60 ± 3.50						t=0.628	0.532
Overall	92.83 ± 3.14						91.43 ± 4.56						t=1.496	0.139

**Table (6)** showed overall mean scores of self-care scales. **Self-care maintenance scale**, showed lowest percentage (23.05% ± 3.74%) during hospitalization, and improved to 44.67% ± 5.84% after one month, then 44.29 ± 7.74% after 3 months of implementing the discharge plan. **Self-care management scale**, was 38.43 ± 3.98% during hospitalization, and improved to 64.0 ± 6.16% and 62.0 ± 8.15% after one and three months respectively. **Self-care confidence scale**, during hospitalization was 27.32± 4.93% and improved to 47.34 ± 8.35% and 40.83% ± 11.67% after one and 3 months respectively. A statistically significant difference was noticed in relation to overall mean scores of CHF self-care scales.

**Table (6):** Comparison of overall mean percent scores of self-care scales among CHF studied groups during the study periods

Heart failure self-care index	Mean % Score		Correlation with Baseline		Difference from Baseline	
	Mean ± SD.		P		Mean ± SD.	
	Control group	Study group	Control group	Study group	Control group	Study group
<b>Self-Care Maintenance Scale:</b>						
During hospitalization	22.48 ± 3.06	23.05 ± 3.74				
After one month	23.05 ± 3.74	44.67 ± 5.84	0.350	<0.001*	0.17 ± 1.07	6.49 ± 2.25
After 3 months	22.48 ± 3.06	44.29 ± 7.74	–	<0.001*	0.0	6.37 ± 2.93
<b>Self-Care Management Scale:</b>						
During hospitalization	39.0 ± 3.80	38.43 ± 3.98				
After one month	38.43 ± 3.98	64.0 ± 6.16	0.586	<0.001*	0.11 ± 1.23	5.11 ± 1.39
After 3 months	39.0 ± 3.80	62.0 ± 8.15	–	<0.001*	0.0	4.71 ± 1.95
<b>Self-Care Confidence Scales:</b>						
During hospitalization	26.69 ± 3.25	27.32 ± 4.93				
After one month	27.32 ± 4.93	47.34 ± 8.35	0.586	<0.001*	0.11 ± 1.23	3.60 ± 1.80
After 3 months	26.69 ± 3.25	40.83 ± 11.67	–	<0.001*	0.0	2.43 ± 2.39

p: p-value for F test (ANOVA) with repeated measures for comparing between Baseline and each other period

\*: Statistically significant at p ≤ 0.05

**Table (7)** illustrated that the overall knowledge significantly improved patients self-care management post one month (p= 0.033\*), as well improved their self-care maintenance and self-care confidence (p= 0.001\*, 0.015\* respectively) 3 months post implementing the discharge plan.

**Table (7):** Correlation between study groups related to the three self-care scales and their five knowledge domains of self-care after one month and 3 months of follow up post implementing the discharge plan.

Study group patient's five knowledge domains.		Congestive heart failure three self-care scales.					
		1 month F/U			3 month F/U		
		Maintenance	Management	Confidence	Maintenance	Management	Confidence
Overall knowledge	R	0.217	0.360*	-0.013	0.529*	0.114	0.407*
	P	0.211	0.033*	0.940	0.001*	0.515	0.015*

## DISCUSSION

In accordance with study hypotheses, an individualized nursing discharge plan, enriched with educational interventions

More than half of the study patients were between 50 ≤ 60 years old. In accordance with our results, Savane and Lu reported that, approximately 50% of HF patients are women. This may be justified by the higher prevalence of hypertension, diabetes, and diastolic dysfunction among women predisposing to CHF<sup>(22)</sup>.

All studied patients complained from dyspnea, reduced exercise tolerance and fatigue, while majority reported edema, orthopnea, and paroxysmal nocturnal dyspnea. This is congruent with Ural *et al.*<sup>(23)</sup> who mentioned that most of CHF patients complained from peripheral edema, chest pain, and fatigue, with the clinical signs of elevated jugular venous pressure, third heart sound, increased weight, rales, orthopnea or paroxysmal nocturnal dyspnea<sup>(23)</sup>. This signifies the importance of individualized nursing interventions in order to decrease readmission rates. Cowie *et al.*<sup>(24)</sup> found that; CHF patient's deterioration is accompanied by fluid retention signs known as extended jugular vein, edema, lung congestion, ascites and third heart sound, which are necessitating urgent medical attention.

In addition, the majority of patients had IHD, while, less than two-thirds had hypertension, diabetes mellitus, and anemia. In this regard, Mesquita *et al.*<sup>(19)</sup> pointed that; many of HF patients have multiple either cardiac or extra-cardiac comorbidities, increasing re-hospitalization risk. Moreover, Madelaire *et al.*<sup>(25)</sup> found that; the non-cardiovascular causes which were often reported by hospitalized HF patients, signifies multidisciplinary approach in order to reduce re-hospitalizations.

More than one-quarter of our patients were diagnosed with HF for three to ≤ five years. In this context, Heart Disease and Stroke Statistics<sup>(26)</sup> reported that; about half of HF patients live beyond 5 years after being diagnosed. However, there is no clear average life expectancy. This could be explained by the fact that CHF is not curable, but early detection and treatment plan compliance may improve QOL, which in-turn leads to increased life expectancy. In addition, Akita *et al.*<sup>(27)</sup> emphasized the importance of monitoring HF patients after discharge for improving their clinical outcomes

being at higher risk of readmission and death within three years. In accordance with our results, Savane and Lu reported that; CHF patients' adherence to low sodium diet is difficult without continuous family support, which contributes to worsening symptoms and increases re-hospitalization<sup>(28)</sup>.

A statistically significant difference between both groups was observed regarding follow up commitment. This could be attributed to increased patients' awareness about the importance of follow up and prognosis. This goes in-line with McAlister *et al.*<sup>(29)</sup> who found that; early scheduled outpatient follow-up appointments are associated with better outcomes within 30 days after discharge to prevent readmissions.

Chemistry tests, ECG and echocardiography had been requested for all studied patients. This could be explained by that CHF confirmation is determined by routine examinations as valuable information. Inamdar and Inamdar<sup>(30)</sup> stated that routine biochemical analysis and echocardiography should be performed on admission for reliable clinical diagnosis to estimate CHF severity, and deciding suitable treatment.

All studied patients had reduced cardiac output, excess fluid volume, activity intolerance and knowledge deficit, while more than half had impaired gas exchange. This goes with a study illustrating that most frequent hospitalized CHF patients nursing diagnoses were; reduced cardiac output, excessive fluid volume, activity intolerance, impaired gas exchange, deficient of knowledge, and impaired physical mobility<sup>(31)</sup>.

The overall CHF knowledge mean percent scores denoted a statistically significant difference between both studied groups explaining better knowledge among study group. Studies recommend implementing a comprehensive individualized CHF nursing discharge planning with continuous monitoring in the outpatient clinic to enhance knowledge, reduce readmissions, improve QOL and increase self-care adherence<sup>(32, 33)</sup>.

There was no statistically significant difference concerning overall self-care of heart failure index

mean percent among control group. This could be explained by the absence of educational programs, which resulted in non-compliance with self-care practices. In this respect, **Tovar** <sup>(33)</sup> illustrated that self-care activity commitment is based on patients' knowledge for making symmetrical choices with provided medical regimen.

Findings also showed a highly statistically significant difference regarding overall mean percent scores of HF self-care index among study group after 1 and 3 months of implementing the discharge plan. In our opinion may be due to decreasing patient's retention of information with time.

Similar studies reported that; the application of a standardized educational nursing intervention for CHF patients reflects improvement of self-care management, self-care behaviors and strongly change self-care scale scores in those HF patients. Moreover, enhances self-confidence to perform optimal self-care management and maintenance, to reduce clinical symptom burden <sup>(34, 35)</sup>.

## CONCLUSION

The current study proved that, CHF patients who received integrated discharge plan with educational program exhibit healthy respiratory and cardiac outcomes in addition to better functional abilities than those who did not. Furthermore, overall knowledge was also improved and significantly reflected in self-care index practices after 1 and 3 months of implementing the discharge plan. Thus, adequate education is systematically associated with higher HF related knowledge.

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